

**TASK 3001**  
**PERFORM WATER BUCKET OPERATIONS**

**WARNING**

**Never dump water onto ground personnel as the water impact could result in injury.**

**Minimize hovering or flying slowly over fires. The rotor wash fans the flames which may cause more hazards to ground crews.**

**When performing this task with cabin doors open, ensure that any personnel in the cabin area are wearing a safety harness secured to a tie-down ring or are seated in a seat with seat belt on.**

**NOTE**

***The water bucket, when loaded is a high-density load with favorable flight characteristics. Reduced Vne and bank angle limits must be kept in mind. Much of the mission profile is flown at high gross weight and low airspeed. Also, density altitude is greatly increased in the vicinity of a major fire. Performance planning must receive special emphasis.***

**CONDITIONS:** In a UH-60 helicopter with an operational cargo hook, water bucket, required briefings and checks completed.

**STANDARDS:** Appropriate common standards plus these additions/modifications:

**1. Rated.**

- a.** Conduct permission planning to determine fuel and bucket cinching requirements. Verify the aircraft will remain within gross weight and CG limitations for the duration of the flight.
- b.** Conduct a thorough crew briefing.
- c.** In conjunction with the NCM(s) complete the required checks to ensure proper system operation prior to mission departure.
- d.** Operate the Water bucket system per manufacture specifications.
- e.** Recognize and respond to a Water bucket system malfunction.
- f.** Use dipping procedures appropriate for the water bucket type.
- g.** Demonstrate knowledge of fire behavior and terminology.
- h. Hook-up and hover:**
  - (1)** Maintain vertical ascent heading  $\pm 10^\circ$ .
  - (2)** Maintain altitude of load 5 feet AGL,  $\pm 1$  foot.
  - (3)** Complete hover power and go-no-go checks.
- i. Enroute:** Maintain safe load obstacle clearance (minimum 50 feet AHO).
- j. Approach and water release:**

- (1) Maintain a constant approach angle to ensure load safely clears obstacles.
- (2) Maintain ground track alignment with selected approach path.
- (3) Execute a smooth and controlled pass or termination over the intended point/area of water drop.

k. Deploy water as directed in proper location, orientation, and/or length.

## **2. Nonrated.**

a. In conjunction with the rated crewmember(s) complete required Water bucket checks to ensure proper system operation prior to mission departure and attach water bucket to the aircraft.

b. Ensure water bucket is configured for the condition and mode of flight.

c. Recognize and respond to a Water bucket system malfunction.

d. Demonstrate knowledge of fire behavior and terminology.

## **DESCRIPTION:**

### **1. Crew actions.**

a. The PC will conduct a thorough crew briefing and ensure all crewmembers are familiar with Water Bucket operations, emergency, and communication procedures. He will ensure that DD Form 7382-R has been completed. He will confirm that required power is available by comparing the information from the PPC to the hover power check.

b. The P\* will remain primarily focused primarily outside the aircraft throughout the maneuver. He will monitor altitude and avoid obstacles.

c. The P will monitor the cockpit instruments and assist the P\* in clearing the aircraft. He will set cargo hook switches, as required, and should make all radio calls. When directed by the P\* during the approach, the P will place the cargo hook arming switch to the ARMED position. The P will release the water on command from the P\* or IAW with the crew briefing.

d. The P and NCM will assist in clearing the aircraft and will provide adequate warning of obstacles. They will announce when their attention is focused inside and again when attention is reestablished outside

e. The NCM will remain primarily focused on the bucket. He will guide the P\* during the bucket pickup, advise of the bucket condition in flight, provide directions and assistance when to dump the water, and direct the P\* when setting down the bucket.

f. The NCM will advise the P\* of any Water bucket faults or failures.

g. External load procedures IAW Task 2048 will be used for normal external load techniques and load call outs, the NCM will advise the P\* when the water bucket is in the water, filling, full, water deploying and empty. He will instruct the P\* as necessary to keep the electrical attachment assembly from entering the water.

### **2. Procedures.**

#### **a. Preflight:**

(1) The PC will analyze the mission using METT-T and determine the amount of water required to conduct the mission and the initial profile to be used during the water emplacement.

(2) The NCM(s) will ensure the Water bucket is installed, all installation checks are completed IAW unit SOP and the Water Bucket operator's manual (SEI Industries LTD).

(3) The crew will conduct the ground checks IAW manufacture procedures to confirm the proper operation of the Water bucket prior to takeoff.

**b. Hook-up and hover.** Once the water bucket is placed on the ground beside the aircraft and all associated wiring is installed, place the cargo release switch in the ARM position. P\* will follow verbal signals from the NCM to hover over the water bucket. Apply control movements as necessary to remain vertically clear and centered over the water bucket. Once in this position smoothly apply collective input until all slack is removed from the suspension cable. Maintain heading with pedals. Apply additional collective to raise the bucket to 5 feet AGL. P will monitor aircraft instruments to ensure aircraft limitations are not exceeded.

**c. Water pick-up: P\*:** Arrive over water source with no forward ground speed and a bucket height of 10 feet above water level. Slowly reduce collective until the bucket makes contact with the water. Once the bucket has inverted and submerged in the water, follow verbal signals from the NCM to remain centered over the bucket as it fills applying cyclic, collective, and pedals as necessary. When the NCM indicates the bucket is ready, or full, increase collective until all slack is removed from the suspension cable and the lip of the bucket is clear of the water. Maintain heading with pedals. Apply additional collective to raise the filled bucket clear of the water's surface to a height of 5 feet. Ensure the bucket is holding the water and monitor aircraft instruments to ensure aircraft limitations are not exceeded.

**P:** During pick-up monitor instruments. During decent call radar altimeter in 10ft. increments. Reference radar altitude when bucket contacts the water surface. Assist stabilized hover with altitude calls while bucket fills. During ascent call altitude until "cables tight" call received from NCM. After "cables tight" reference TGT. Call when reaching 800°C. Thereafter, call each 10° increase to 840°C. At 840°C state "On TGT Limiter". Above 840°C reference Nr. Call each % of Nr droop. "1% droop", "2% droop", if droop reaches 3% the P releases the water.

**NCM:** Calls from the NCM are as follows: "Bucket at 10ft". "Bucket in the water". Bucket submerged". "Bucket full, come up". "Cables tight". "Bucket out of the water". "Bucket at 10ft and clear for flight".

**d. Takeoff.** Establish a constant angle of climb that will permit safe obstacle clearance. When above 100 feet AGL or when clear of obstacles, adjust attitude and power as required to establish the desired rate of climb and airspeed. Smoothly adjust flight controls to prevent bucket oscillation.

**NOTE:** Ensure that the cargo hook-arming switch is in the ARMED position when operating at altitudes below 300-feet AHO and in the SAFE position above 300-feet AHO.

**e. Enroute.** Maintain the desired altitude, flight path, and airspeed not to exceed 100KIAS. Make smooth control applications to prevent bucket oscillation. If a lateral bucket oscillation occurs, reduce airspeed. If a fore-and-aft oscillation occurs, begin a shallow turn while reducing airspeed. Avoid over-flight of populated areas whenever possible.

**NOTE 1.** Recommended enroute airspeed with loaded or unloaded water bucket is 90 KIAS.

**NOTE 2.** When flying with the bucket empty, open the bucket to allow streamlining. This prevents the bucket from twisting and pinching the cables

**f. Approach and water release:** Altitude and airspeed affect the dump pattern. It is most concentrated at lower altitudes (AGL) and at a hover. The pattern will spread with Altitude and speed. The PC will determine the most appropriate height and speed for the pattern desired or IAW mission briefing. When the approach angle is intercepted, decrease the collective to establish the descent. When passing below 300 feet AGL, place cargo hook in ARM position. Maintain entry airspeed until apparent ground speed and rate of closure appear to be increasing. Progressively decrease the rate of descent and forward airspeed until just below effective translational lift is attained with the water bucket between 20 – 50 feet above intended release point. This method is effective for fires in heavily wooded terrain. For water release on a fire line or large area, maintain water bucket at 20 - 50 feet above intended release point and airspeed between slightly above effective translational lift not to exceed 50 KIAS for more effective coverage. P\* confirms with MHEM the location of the drop. Aligns the aircraft in the desired drop direction and counts down to the drop. "3-2-1-DROP". NCM confirms location and that the bucket is not swinging adversely, the drop area is clear, releases the water and calls "Water Away" as bucket empties. If the area is not clear or the bucket does not release the water the NCM calls "No Drop". Other crewmembers may be designated by the PC to release the water based on crew work load or terrain conditions. In these circumstances all crewmembers should assist in confirming drop area is clear and water released.

**NOTE 1.** The bucket manufacturer does not recommend dumping at airspeeds above 50 KIAS.

**NOTE 2.** There is a delay of appropriately 0.5 to 1.0 seconds between the activation of the dump switch and the discharge of the water.

**NOTE 3.** If the bucket fails to open, gently lower the bucket to the ground. With the bucket resting on the ground, move the aircraft laterally to dump the water out of the bucket and repeat the fill-up procedure.

**NOTE 4.** Avoid flight over populated areas. Deployment to drop locations should be done with Bambi Bucket stowed inside aircraft.

**NOTE 5.** A go-around should also be initiated if visual contact with the water release area is lost or any crewmember announces "climb, climb, climb". This phrase will only be used when there is not enough time to give detailed instructions to avoid obstacle.

**NOTE 6.** Table 4-6 is a sample water bucket procedure guide for water bucket operations to include sample calls for dropping water based on type of water bucket.

**g. Post mission:**

(1) Ensure Water bucket is serviceable.

(2) De-rig aircraft and water bucket. Ensure all documentation is complete on water bucket usage and inspection.

**SAND/DUST/SMOKE CONSIDERATIONS:** If during the approach, visual reference with the water release area or obstacles is lost, initiate a go-around or ITO as required, immediately. Be prepared to transition to instruments. Once VMC is regained, continue with the go-around. (If required releasing the water reduces the GWT by 5000 – 6000 lbs and minimizes power demand).

**MOUNTAINOUS AREA CONSIDERATIONS:** If at any time during an approach, insufficient power is not available, turbulent conditions or wind shift creates an unsafe condition, perform a go-round immediately. (If required releasing the water reduces the GWT by 5000 – 6000 lbs and minimizes power demand).

**OVERWATER CONSIDERATIONS:** All crewmembers will wear floatation devices. Overwater flight, at any altitude, is characterized by a lack of visual cues, and, therefore, has the potential of causing visual illusions. Be alert to any unannounced changes in the flight profile and be prepared to take immediate corrective actions. The radar altimeter low bug should be set to assist in altitude control. Operations become increasingly more hazardous as references are reduced (open water versus a small lake), water state increases (calm to chop to breaking condition with increasing wave height), and visibility decreases (horizon becomes same color as water, water spray or rain on windshield, sunny mid-day Vs twilight).

**NOTE:** There is a high probability the Doppler (AN/ASN-128) MEM indicator lamp will light while flying over glassy smooth water. However, if the lamp remains on for over 10 minutes, over land or rough water, there is a malfunction in the Doppler set.

**NIGHT OR NVG CONSIDERATIONS:**

1. During WATER bucket operations the P\*'s attention will be divided between the aircraft instruments (altitude and ground speed) and the outside. It is critical during NVG operations that the P's and NCM's focus be primarily outside to provide warning to the P\* of obstacles or hazards during the entire operation.

2. Spatial disorientation can be overwhelming during over water operations at night. Proper scanning techniques are necessary to avoid spatial disorientation. If there are visible lights on the horizon or if the shoreline can be seen the pilot may opt to approach and hover the aircraft so it is pointed toward these references, if the wind permits. If no other references exist, deploy chemlights to assist in maintaining a stable hover during the water pick-up.

**TRAINING AND EVALUATION REQUIREMENTS:**

1. **Training.** Training will be conducted in the aircraft.

2. **Evaluation.** Evaluation will be conducted in the aircraft.

**REFERENCES:** Appropriate common references plus the following:

Water Bucket Operations Manuel (SEI Industries LTD.)

Water Bucket Air Worthiness Release

AR 70-62 FM 55-450-1 FM 20-32

**WATER BUCKET PREFLIGHT CHECK**

1. Bottom of chain for tears in fabric.
2. Shackle and lockwire or tie wrap condition.
3. Sidewall battens.
4. Diagonal M-straps connecting the suspension cables for wear.
5. Purse lines on the fabric dump valve.
6. Cinch strap belt – end opposite the D-ring shall have a knot.
7. Suspension lines for frays, kinks and conditions.
8. Ballast pouch in the bucket for rips or holes.
9. Control head for secure fittings.
10. Tripline for kinks, frays, or loose swages.
11. Perform operational check of control head.

## **EXTERNAL LOAD CREW BRIEFING**

### **PILOT NOT ON THE CONTROLS**

1. Arm cargo hook "ALL" on pilot's command.
2. Turn off pilot's radio switches and make radio calls.
3. ALQ-144 OFF, M-130 SAFE.
4. Monitor instruments and maintain clearance.
5. Advise pilot before any limits are reached.
6. Perform hover power check – verify GO/NO GO.
7. Call sling height on radar altimeter.
8. Call TGT and Nr as appropriate.
9. Release water if 3% Nr droop is observed
10. Perform before takeoff or landing checks.
11. Safe or ARM hook 300' and announce single engine A/S.
12. On approach call 100' AGL.

### **NCM**

1. Wear safety harness, visor down (except NVG).
2. Center aircraft over load (keep directions concise-one at a time).
3. Inform pilot: Man clear (l/r), clear to pick-up, slings coming tight, load-clearing ground.
4. Stabilize load 10' height, clear for takeoff.
5. Advise bucket in water, submerged, full, cables tight, bucket out of water, clear of barriers on takeoff.
6. Monitor load during flight.
7. On approach call load from 100' above ground.
8. Call for slack, release load when safe.
9. Check load released, clear aircraft for flight.
10. Hook operations – normal and emergency.

### **DUMPING WATER**

1. Pilot calls: 100' bucket height, 10 seconds from target, 3-2-1-Drop.
2. Crew Chief response: "Water away, bucket empty."
3. Copilot monitor radar altimeter and TGT.

### **LANDING**

1. Normal load approach.
2. Clear bucket to ground.
3. Clear to slide (direction) away from load.
4. Release the slings and disconnect electrical lines.

### **EMERGENCY PROCEDURES**

1. Open the bucket: IF NECESSARY.
2. Call bucket open – bucket empty
3. Jettison the load: IF NECESSARY
4. Call – load jettisoned.
5. Hook Operations – Normal and Emergency.
6. Lost Commo procedures.

**Table 4- 8 Water bucket procedure guide**

